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filled by the second, and $\left(1-\frac{my}{nx}\right)y$ the time which it would take it. $\therefore\ \frac{my}{n}+\left(1-\frac{my}{nx}\right)y$=time in which the vessel would be filled. Since $\frac{xy}{x+y}$ is the time during which the vessel would be filled were both pipes kept open,

$$\therefore\ \frac{my}{n}+\frac{(nx-my)y}{nx}=\frac{xy}{x+y}+t\ldots.(1).$$

If both pipes had been kept open during the time $\frac{xy}{x+y}$, $\frac{y}{x+y}$ would have been the part of the vessel filled by the first pipe,

$$\therefore\ \frac{y}{x+y}=\frac{p}{q}\left(1-\frac{my}{nx}\right)\ldots.(2).$$

Reducing the equation (2), we get $mpy^2+(mp+nq-np)xy-npx^2=0$.

Solving this with reference to y, a mere quadratic, we get y expressed by x. Let us, for the sake of brevity, put $y=rx$. Substituting this in (1), we obtain a simple equation in x, whence,

$$x=\frac{nt(1+r)}{(m+nr-mr^2)r},\ y=\frac{nt(1+r)}{m+nr-mr^2}.$$

Solved also by Professor *Whitaker* and the *Proposer*.

7. Proposed by O. S. KIBLER, Superintendent of Schools, West Middleburg, Logan County, Ohio.

A's age equals *B*'s age plus the cube root of *C*'s age; *B*'s age equals *C*'s age plus the cube root of *A*'s age plus 14 years; and, *C*'s age equals the cube root of *A*'s age plus the square root of *B*'s age. What is the age of each?

Solution by J. F. W. SCHEFFER, A. M., Hagerstown, Maryland, and H. C. WHITAKER, B. S., M. E., Philadelphia, Pennsylvania.

Denoting by x^3, y^2, z^3, respectively, the ages of A, B, C, we have the equations $x^3=y^2+z\ldots.(1)$, $y^2=z^3+x+14\ldots.(2)$, $z^3=x+y\ldots.(3)$. By adding (2) and (3) we get $x=\frac{1}{2}(y^2-y-14)$, and from (1), $z=\frac{1}{8}(y^2-y-14)^3-y^2$. Substituting these two values in (3), we get an equation of the 18th degree, which it would be a piece of folly to solve, since the only rational values of x, y, z, viz.; $x=3$, $y=5$, $z=2$, can with little trouble be obtained from the original equations.

8. Proposed by H. M. CASH, Salesville, Ohio.

The longer side *BC* of a field in the form of a parallelogram is *a* (78) rods; the sum of its shorter side *AB*, and greater diagonal *AC* is *b* (114) rods; the distance from *B* at right angles with *AB* to a tree standing on *AC*, is *c* (32) rods. Find the area of the field, and the distance from the tree to the corners *A*, *C*, and *D*.

Solution by H. C. WHITAKER, B. S., M. E., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.

Denote the position of the tree by T, the distance AT by x, CT by y, and AB by $b-x-y$.

$$\text{Now } x=\frac{c}{\cos ATB}=-\frac{c}{\cos BTC}=\frac{2c^2y}{a^2-c^2-y^2}.$$

Also $x^2=c^2+(b-x-y)^2$, whence $x=\frac{b^2+c^2-y^2-2by}{2b-2y}$.

Equating these values of x gives,

$y^4-2by^3+(b^2-a^2-2c^2)y^2+2b(a^2+c^2)-(a^2-c^2)(b^2+c^2)=0$. Substituting the